# KPDES FORM HQAA

AI # 102259

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## Kentucky Pollutant Discharge Elimination System (KPDES)

### High Quality Water Alternative Analysis

The Antidegradation Implementation Procedures outlined in 401 KAR 5:030, Section 1(3)(b)5 allows an applicant who does not accept the effluent limitations required by subparagraphs 2 and 3 of 5:030, Section 1(2)(b) to demonstrate to the satisfaction of the Environmental and Public Protection Cabinet that no technologically or economically feasible alternatives exist and that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located. The approval of a POTW's regional facility plan pursuant to 401 KAR 5:006 shall demonstrate compliance with the alternatives analysis and socioeconomic demonstration for a regional facility. This demonstration shall also include this completed form and copies of any engineering reports, economic feasibility studies, or other supporting documentation

## I. Permit Information

| | | | |
|---|---|---|---|
| **Facility Name:** | Nally & Hamilton Enterprises, Inc. | **KPDES NO.:** | DSMRE No: 866-0304 Bear Br. #1, Amendment #1 KYG046317 |
| **Address:** | P.O. Box 157 | **County:** | Leslie |
| **City, State, Zip Code:** | Bardstown, KY 40004 | **Receiving Water Name:** | Wolf Creek and Beatty Branch |

## II. Alternatives Analysis - For each alternative below, discuss what options were considered and state why these options were not considered feasible.

1. **Discharge to other treatment facilities.** Indicate which treatment works have been considered and provide the reasons why discharge to these works is not feasible.

The closest water treatment facility to the operation (Latitude 37-03-12/Longitude 83-14-19) is the Hyden Wastewater Treatment Plant in Leslie County (Latitude 37-10-23/Longitude 83-21-59). The wastewater treatment facility is approximately 16 miles from the operation. To effectively transport the discharge to this facility it would require lift and pump stations. The pump stations cost approximately $200,000.00 each and approximately $403,690.00 per year to pump and maintain them. Implementing pump stations at this rate would be exceptionally expensive. With piping cost estimated at $22/foot, alone would cost over $4.7M. (16 miles X 5,280 ft/mile = 84,480 ft. X $22/foot = $1,858,560.

Trucking Cost: It has been calculated that during mining discharge during a 25 year 24 hour storm is 52,469,490 gallons/hour and 1,259,267,751 gallons/day. One truck with a 10,000 gallon capacity would cost $278.75 per trip to transport storm water to the Hyden Wastewater Treatment plant. One truck could make 10 trips per 24 hour time period. 10 trips/day X $278.75 = $2,787.50 per truck per day. 10 trips/day per truck X 10,000 gallons/truck = 100,000 gallons per truck per day. 1,259,267,751 gallons/day divided by 100,000 gallons/truck = 12,592.68 trucks/day required to transport the water. 12,592.68 trucks/day X $2,787.50 per truck = $35,102,089 per day to transport the water by truck. 12,592.68 trucks would occupy approximately 71.55 miles of roadway which is greater than the round trip distance to the treatment plant which is approximately 32 miles. The trucks would create a safety problem on the narrow, crooked public road if there was any room for the public on the roads. There is no place in the county to park 12,592.68 trucks or any fraction thereof when they are not needed and there are a lack of maintenance facilities and a shortage of drivers for the trucks. In order to truck the water storage ponds would need to be built on site to hold the water until it could be transported. There is insufficient space in this area to construct the size ponds needed.

Hyden Wastewater Treatment Plant: The Hyden treatment plant is a biological plant designed to treat raw sewage. In order to accommodate and treat storm water for sediment control the plant would be required to construct the same types of sediment ponds that are proposed for the mining operation. 1,259,267,751 gallons per day would require a 193.21 acre pond 20 feet deep to store the storm runoff for one day. The entire city of Hyden is 0.8 square miles and most of the gently sloping land is occupied. The population density is 256.01 people per square mile so there is no place to build a 193.21 acre reservoir in Hyden. The Surface Mining Control and Reclamation Act of 1977 does not allow for water to be removed from the watershed. Hydrologic balance must be maintained.

2. **Use of other discharge locations.** Indicate what other discharge locations have been evaluated and the reasons why these locations are not feasible.

There are no other specific sites of discharge located within the Wolf Creek, Beatty Branch or Wolf Creek watershed areas of this permit. All three of these watersheds discharge into Cutshin Creek that discharges into the Middle Fork of the Kentucky River. There are other tributaries located to the north of the affected area, Bear Branch and Cowhead Branch, that were considered. The cost to discharge to these areas are as follows: Total distance is approximately 14,500 feet to pipe to these watersheds. It would require at least 5 pump stations at a cost of $200,000.00 per station X 5 = $1,000,000.00. At $22/foot piping estimate, piping would be 14,500' X $22/foot = $319,000.00. Total cost = $1,319,000.00. This does not include the cost to run electric lines to the pump stations or maintenance. Ultimately the discharge would still enter the Cutshin Creek of the Middle Fork of the Kentucky River.

## II. Alternatives Analysis - continued

3. **Water reuse or recycle.** Provide information about opportunities for water reuse or recycle at this facility. If water reuse or recycle is not a feasible alternative at this facility, please indicate the reasons why.

The water from this job could be used for maintaining dust and for watering of the postmining land, but after evaluating the option, it was found to not be useful because the slope of the land is greater than 10%. With the slope of the land being greater than 10%, the water couldn't be absorbed quickly enough. The effects of this problem would greatly impact the land, and cause economic stress, by possibly causing slides and erosion of soil. Please note that some of the water will be used for dust control. A 5,000 gallon water truck can dispense approximately 5,000 gallons per hour and a maximum of 40,000 gallons per 8 hour day. The twelve ponds control 52,469,490 gallons per hour and 1,259,267,751 gallons per day during a 25 year 24 hour storm. Before mining and on-site treatment the discharge is 44,924,602 gallons per hour and 1,078,190,447 gallons per day for the same storm event. A portion of the water can be used during reclamation activities. A 5,000 gallon hydro-seeder can dispense approximately 6 loads per day which is 30,000 gallons per day. The hydro-seeder is used on the average of 17 days during a normal seeding year. Within 17 days 510,000 gallons of water can be utilized. A portion of the water can be used during reclamation but not all water can be utilized. The abundant supply of water is in excess of the amount that can be utilized on the job. This demonstrates that on-site treatment is preferable.

4. **Alternative process or treatment options.** Indicate what process or treatment options have been evaluated and provide the reasons they were not considered feasible.

The first alternative treatment option that was explored was Limestone Sand Dosing. Limestone Sand Dosing is when limestone sand is being added to an acidic stream by a dump truck. The limestone would be distributed downstream by periodic flooding. The sand must be replenished approximately 1 or 2 times per year, depending on flooding frequency. Limestone sand addition is most effective for streams that have low pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream, but probably over a shorter stretch than without treatment. [4] This option is available but somewhat unrealistic. As stated, the limestone sand is added by dump trucks. Even with the availability of trucks already on site, one isn't guaranteed this option will work. The site must have truck access to streams at all times. All ponds may not have truck access at all points in time, therefore hindering the use of this option. This is not withstanding the cost to do this option. According to a study, the estimated cost of this project is $200,000 [5] per site. This estimate includes the $350.00/ton of limestone cost, and the cost of sand. The cost per small dump truck is ~$47,500.00, not including maintenance and upkeep. Limestone sand dosing per site is $200,000.00+.
A second option of limestone channeling was also considered. Limestone channel bars are constructed by combining limestone gravel and sand. The limestone gets coated by iron or aluminum hydroxides, but some limestone dissolution still occurs. These methods are most effective for streams that have low

## II. Alternatives Analysis - continued

pH, but also relatively low dissolved metal concentrations. Iron and/or aluminum hydroxides precipitate in the stream. Again, the cost of installation and upkeep would reach well over $200,000.00 per site. (Including limestone and the cost of dump trucks) This option isn't workable because of the following limitations and obstacles:

1. Limestone does not guarantee a safe result.
2. Limestone is easily coated and is then ineffective.
3. Limestone must be replaced regularly.
4. Limestone is unpredictable. [9]

A third option would be to construct treatment facilities on or near the site. To transport the discharge to treatment facilities would require multiple lift and pump stations, (which are approximately $200,000.00 each, and it cost approximately *$403,690* per year, per pump to maintain them)[10] Implementing pump stations at this rate would be exceptionally expensive. With piping cost, estimated at $22/foot, piping for a 5 mile radius would cost over $580,000.00. (5 miles X 5280 ft/mile= 26,400.00 feet. 26,400.00 feet X $22/foot = $580,800.00) After the job is finished, there would be no sewage users, thus the septic system would have to be removed. (The cost for this would also be great.) With a labor rate of ~$25.00 per hour to remove lines, haul garbage, etc, the removal would cost, alone, more than $30,000.00. (4 people working at 4 weeks = 640 hours. 640 hours X $25.00/hour = $16,000.00. $16,000.00 + the cost to remove and dispose of the system = $20,000.00+)

All three options obviously aren't reliable and may impose unsafe conditions, notwithstanding the fact that results on ph, alkalinity and other water tested components are going to fully depend on the limestone actions, therefore being inaccurate.

Because surface mining techniques must be used to maximize the recovery of coal reserves, on site water treatment were considered. Sediment ponds will be used to retain the water for an acceptable amount of time to allow the solids to settle effectively. Silt fences, straw bales and rock check dams can be used on site and in lower elevations where run-off may not flow to a pond. However these devices would not be stable in the steeper areas where strong flows could/ would possibly occur.

5. **On-site or subsurface disposal options.** Discuss the potential for on-site or subsurface disposal. If these options are not feasible, then please indicate the reasons why.

One would be a site-specific sewage system. In most cases, the disposal of wastewater into public sewers is an infeasible option, as the mining facility is located in a remote area away from the urban settlements. Even if the mining industry was located near a public sewer, it would not be allowed to discharge the wastewater into public sewers as the quantity and quality of mine wastewater can create considerable imbalance in the operation of municipal wastewater treatment plant. However, the cost of building a site specific septic system is great. As stated above, to effectively transport the discharge to this facility it would require multiple lift and pump stations, (which are approximately $200,000.00 each, and it cost approximately *$403,690* per year, per pump to maintain them)[11] Implementing pump stations at this rate would be exceptionally expensive and very unfeasible. With piping cost, estimated at $22/foot, alone piping for a 5 mile radius would cost over $580,000.00. (5 miles X 5280 ft/mile= 26,400.00 feet. 26,400.00 feet X $22/foot = $580,800.00) After the job is finished, there would be no sewage users, thus the septic system would have to be removed. (The cost for this would also be great.) With a labor rate of ~$25.00 per hour to remove lines, haul garbage, etc, the removal would cost, alone, more than $30,000.00. (4 people working at 4 weeks = 640 hours. 640 hours X $25.00/hour = $16,000.00. $16,000.00 + the cost to remove and dispose of the system = $20,000.00+)

Secondly, we looked at implementing a cistern system. The normal cistern system is estimated to cost approximately $12,000.00/each 5000 gallon tank.[12] With 1,259,267,751 gallons of water from a 25 year 24 hour storm, at least 251,854 cistern tanks. Thus, the cost to even establish this option would be $3,022,248,000.00 ($12,000.00 X 251,854 tanks).* This estimate does not include the cost of maintaining the cistern system. Maintenance alone is ~$16,233.00 per year/per cistern* It, again, is obvious that this wouldn't be a cost-effective method of water recycling.

The next option evaluated was to dispose of wastewater into an underground mine through a piping system. There are no known old underground works in the area Water that accumulates or is placed in abandoned mines usually finds an outlet and in this case the discharge locations could not be determined prior to their use. Water accumulating in underground mines also has the potential to cause "blowouts" that results in water discharging at high velocities creating severe erosion, flooding potential and discharge of waters of unknown quality. In order to get all water into an abandoned mine would also require piping and pumping at the same costs listed above.

6. **Evaluation of any other alternatives to lowering water quality.** Describe any other alternatives that were evaluated and provide the reasons why these alternatives were not feasible.
Choosing not to mine this area as a means of lowering water quality was evaluated, but due to the loss of jobs, loss of other indirect jobs, and loss of revenues relating to this operation would have a negative economic effect. This operation will directly employ approximately 48 individuals and these jobs will not be there if this option was selected.

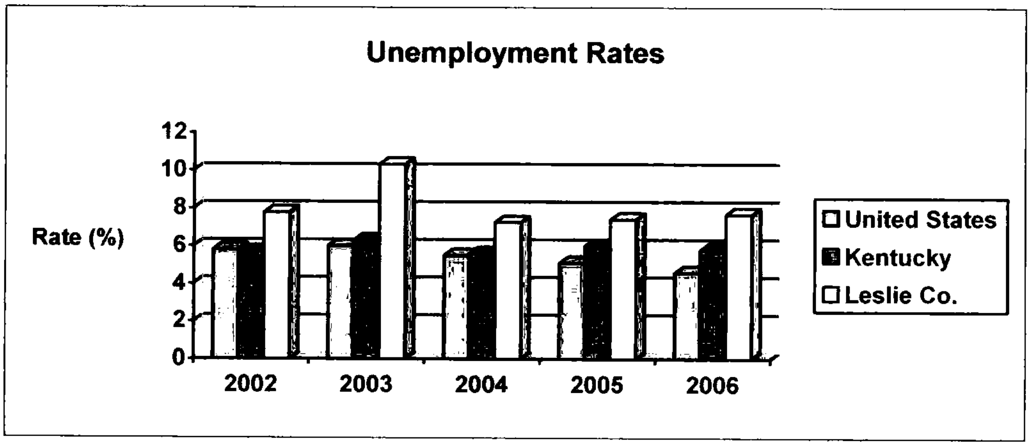
Another alternative would be to accept more stringent water limits. This would cause the iron requirement to go from 1.0 to 0.5. To maintain these limits, one would have to continually ad soda ash and lime. According to a test run in AMDtreat4.0 (this program can be obtained and downloaded at http://amd.osmre.gov/GettingStarted.htm#Reverse) to maintain these limits would cost approximately $23,512.00 more than the current costs. Withstanding the fact that the lowering of limits wants to be avoided, the cost is quite steep per change.

## III. Socioeconomic Demonstration

1. State the positive and beneficial effects of this facility on the existing environment or a public health problem.

Prior surface and underground mining occurred in this area, thus affecting some of the watersheds. However, the area will benefit because once mitigation begins, the stream banks will be stabilized to prevent erosion. Also, species indigenous to the area will be planted and help establish an adequate riparian zone; Stream channels will be rehabilitated to curb sedimentation. This will provide a healthier habitat for aquatic species and wildlife leading to a well balanced ecosystem. It has been calculated that 26 acres of previously disturbed area within the mining area will be rehabilitated. State and federal regulations are being followed so that no problems occur.

2. Describe this facility's effect on the employment of the area




Employment in the Yeaddiss, Cutshin, Leatherwood and Hyden communities will be directly and indirectly impacted with new employment. These communities in Leslie County have an unemployment rate that is quite higher than the state and national averages. (See Chart above) This specific project is expected to employ approximately 48 individuals who will aide in lowering the unemployment rate, in an area that lacks employment and business opportunities.

3. Describe how this facility will increase or avoid the decrease of area employment.

Leslie County needs the coal industry for employment and funding. According to www.coaleducation.org, Leslie county miners make up 14.3% of the total employed people in the county. Total to be added by Nally & Hamilton Enterprises = 48) It is estimated that 15 of the jobs will be transfers from jobs in other counties and 33 jobs will be new jobs. Therefore, this mining operation will raise the percentage of mining jobs in Leslie county by 6.2%. Data extrapolated from the Kentucky Cabinet for Economic Development's "Economic Impact of Gaining or Losing 100 Jobs: 2003; indicated that for mining if 48 jobs were created (Direct employment) 35 Indirect jobs and 60 Induced jobs would be created bringing the total to 143. If the jobs were taken away, there would be a detrimental effect on the population, causing a drastic rise in unemployment rates. The jobs provided by this project will assure that these employees will not increase an already high unemployment rate.

4. Describe the industrial or commercial benefits to the community, including the creation of jobs, the raising of additional revenues, the creation of new or additional tax bases.

In addition to direct jobs provided by this project, it will also provide indirect employment opportunities, including equipment sales, engineering services, food services, fuel sales, transportation, and other services. During the fiscal year 2006-2007, alone, LeslieCounty generated $10,866,581 [13] in coal severance tax money, of which $2,493,115 (LGEDF) is slated to be returned back to the county.

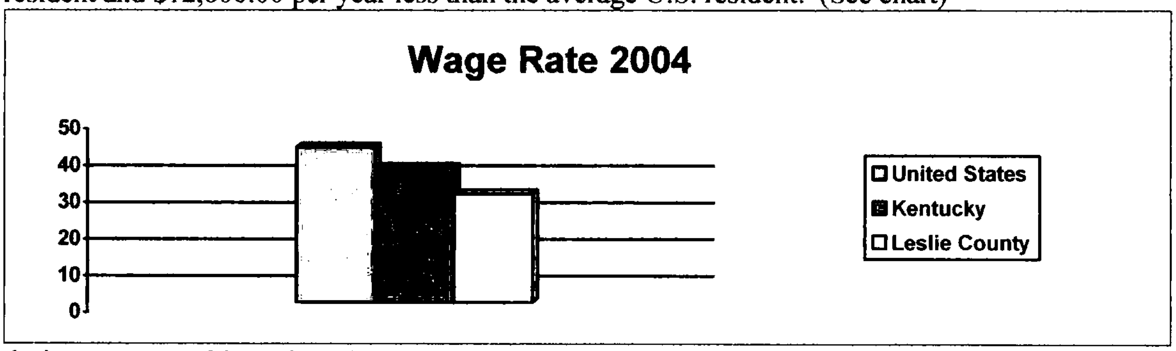
(This mining operation is expected to raise an additional $453,600 in severance tax money which is an increase of 18%.) This money is used for local education, health services, and infrastructure projects. The addition of this job will contribute to this tax base.

5. Describe any other economic or social benefits to the community.

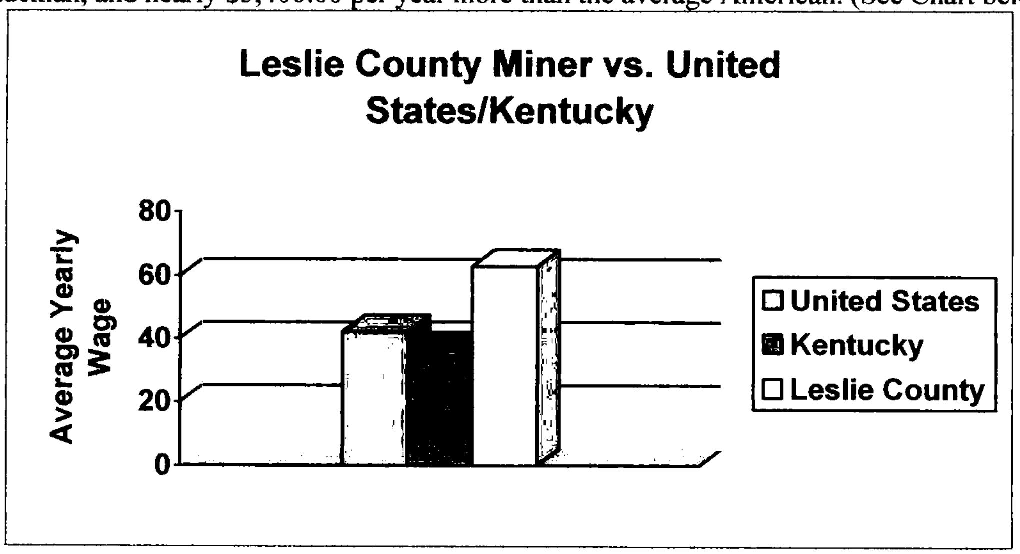
As stated above, with the additional contribution of taxes that the county will receive from the coal severance taxes, public roads, buildings, and other infrastructures will benefit from this job. This operation is expected to generate $453,600 in additional coal severance tax money.

Also, the work on the haul road will benefit the public. This provides better access to the community, and since the coal operators are repairing the roads, the county monies can be distributed elsewhere. There will be 35,955 feet (6.81 miles) of new roads constructed and maintained by the mining operation. This total includes the original permitted area as well.

The jobs that this project provides pay some of the highest wages in Leslie County. The average miners salary will be approximately $1,310.71 weekly and $62,914.08 annually. This will obviously have a positive impact on the community's economy. The average earnings rate will rise, causing a more desirable, livable environment. 2006 data shows that the average Leslie County resident earned almost $7,100.00 per year less than the average Kentucky resident and $12,600.00 per year less than the average U.S. resident. (See chart) [14]




However, during a comparable period, the average Leslie County **miner** earned almost $10,900.00 per year more than the average Kentuckian, and nearly $5,400.00 per year more than the average American. (See Chart below) [15]



## III. Socioeconomic Demonstration - continued

| | Yes | No |
|---|---|---|
| 6. Will this project be likely to change median household income in the county? | ☒ | ☐ |
| 7. Will this project likely change the market value of taxable property in the county? | ☒ | ☐ |
| 8. Will this project increase or decrease revenues in the county? | ☒ | ☐ |
| 9. Will any public buildings be affected by this system? | ☐ | ☒ |

10. How many households will be *economically* or *socially* impacted by this project? ~143+ (48 being direct employees, 95 being indirect)

11. How will those households be *economically* or *socially* impacted? (For example, through creation of jobs, educational opportunities, or other social or economic benefits.)

The average weekly earnings for a mining employee in Leslie County in 2006 was $1,310.71 without overtime. With overtime pay these households may earn approximately $1,600.00 weekly and $76,800.00 annually. This influx of monies will allow these households the ability to maintain and/or enhance their economic status and the ability to purchase necessities as well as non-necessities and provides opportunities for improved social welfare by being able to provide higher education for their children. The remaining households are benefited when the workforce spends money within the community and that benefits the local economy. As the local economy improves a percentage of this revenue is used to make improvements to businesses, homes and property thereby increasing the market value of taxable property. The creation of permanent roads by mining also raises the value of properties in the area by providing access to areas once inaccessible and that improves property values and impacts households. Therefore, there is a direct benefit to the employees household as well as households within the community thereby creating a positive impact.

| | Yes | No |
|---|---|---|
| 12. Does this project replace any other methods of sewage treatment to existing facilities? (If so describe how) | ☐ | ☒ |

Residents in the surrounding permit area either use septic tank systems, or other means of waste disposal. There is no other treatment taking place within the project boundary.

| | Yes | No |
|---|---|---|
| 13. Does this project treat any existing sources of pollution more effectively? (If so describe how.) | ☒ | ☐ |

Sediment control from mining will be improved. Haul roads in the area will be maintained and improved to assure proper water containment. There are gas wells in the area, lacking any form of control. This project will improve sediment control for these locations by the construction of silt ponds.

## III. Socioeconomic Demonstration - continued

| | Yes | No |
|---|---|---|
| 14. Does this project eliminate any other sources of discharge or pollutants? (If so describe how.) | ☒ | ☐ |

Existing overgrowth by invasive plant species will be removed and channelization of receiving streams due to excessive silting will be improved. Prior to the start of this project, the mine site will be cleared of all garbage material and disposed of properly.

Existing storm water runoff from pre-law mining areas will be routed through an approved silt structure. Water quality is monitored at the outlet end of silt structures and if water quality standards are out of compliance treatment measures are implemented. Potential sources of acid mine drainage will be backfilled and sealed to prevent exposure to water.

Prior to the start of this project, the mine site will be cleared and all garbage material will be disposed of.

15. How will the increase in production levels positively affect the socioeconomic condition of the area?

This project will remove approximately 888,536 tons of coal on the amendment area that would not have been recovered or made available to the market otherwise resulting in the direct employment of 48 people in the area. It will also create new employment opportunities, aid in development and maintenance of indirect jobs, and will increase the amount of money the area receives in personal and severance tax. Increased production of coal increases the volume of coal on the market. Increased coal volumes reduces the price per ton paid by utilities. Reduced prices results in lower electricity costs to personal households and industrial consumers. Lower electricity costs as well as lower costs for manufactured goods positively affects the socioeconomic conditions for the region where the number of fixed income levels for individual households are above average. With increased production the company can afford higher wages, better health insurance, retirement and holiday pay. With good fringe benefits the company can attract quality workers and in return quality workers can create a viable housing market and improved neighborhoods. This mining operation is expected to raise an additional $2,598,968.00 in severance tax money of which 50% would be returned to the county. Local governments use a large portion of this money to improve and maintain roads and other infrastructure.

16. How will the increase in operational efficiency positively affect the socioeconomic condition of the area?

The increase in operational efficiency will in turn increase the production levels leading to increased employment opportunities in the area, maintenance of existing employment, development and maintenance of indirect jobs. It will also increase monies and taxes obtained from coal.

Through this, recovery of more coal is possible, and this leads to increase in production having a positive effect on the area.

**IV Certification:** I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| | | | |
|---|---|---|---|
| **Name and Title:** | **Stephen Hamilton (Secretary/Treasurer)** | **Telephone No.:** | (502) 348-0084 |
| **Signature:** | Stephen Hamilton | **Date:** | **03/18/2009** |

[1]

[4] Acid Mine Drainage Treatment Plans
http://www.facstaff.bucknell.edu/kirby/AMDtrmt.html

[5] http://www.epa.gov/owow/nps/Success319/state/ky.htm#results

**[9] Limestone Treatment of Acid Waste**
A white paper by Wastech Controls & Engineering, Inc.,
http://www.wastechengineering.com/papers/limestone.htm

[10] Estimate derived from:
http://www.pumpingmachinery.com/pump_magazine/pump_articles/article_33/PS%20paper%20November%2010%202004.doc

Pump Operation Costs as a Function of Operating Flow in Wastewater Treatment
Case Study
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[11] Estimate derived from:
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[12] [4] Kessner, K., 2000: How to Build a Rainwater Catchment Cistern. The March Hare, Summer 2000, Issue 25, (http://www.dancingrabbit.org/newsletter/)

[13] **Expanded Online Kentucky Coal Facts, http://www.coaleducation.org/Ky_Coal_Facts/Default.htm**

[14] http://www.workforcekentucky.ky.gov/cgi/dataanalysis/incomeReport.asp?menuchoice=income

[15] http://www.coaleducation.org/Ky_Coal_Facts/Default.htm